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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/563,630	03/06/2006	Hiroshi Fujioka	118075-002	1962
29175	7590	11/21/2007		
BELL, BOYD & LLOYD, LLP			EXAMINER	
P. O. BOX 1135			GOODWIN, DAVID J	
CHICAGO, IL 60690				
			ART UNIT	PAPER NUMBER
			2818	
			MAIL DATE	DELIVERY MODE
			11/21/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

**Application No.**

10/563,630

**Applicant(s)**

FUJIOKA ET AL.

**Examiner**

David Goodwin

**Art Unit**

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 23 October 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 22-30 is/are pending in the application.
- 4a) Of the above claim(s) 22-27 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 28-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election without traverse of 28, 29, and 30 in the reply filed on 10/23/07 is acknowledged.

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claim 28 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.
4. Claim 28 recites forming a  $\text{In}(x)\text{Ga}(1-x)\text{N}$  ( $0 \leq x \leq 0.4$ ) on a ZnO substrate having a surface roughness of 10 angstroms or less.
5. The specification only supports forming a GaN layer on a ZnO substrate having a surface roughness of 10 angstroms or less.
6. Claims 29 and 30 are rejected as depending from and incorporating claim 28.

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 28, 29, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Letertre (US 7,265,029) in view of Hosono (US 2005/0039670) in view of White (US 6342313) in view of Yano (US 6045626).
3. Regarding claim 28.
4. Letertre teaches a method of making a structure. Said method comprises forming a seed layer (12) comprising zinc oxide (column 8 lines 5-20). Said seed layer having a crystal lattice parameter (column 8 lines 15-25). The zinc oxide layer (12) is then subjected to polishing and annealing (column 8 lines 15-20). A working layer (30) is then deposited on the seed layer (12) (column 8 lines 25-35). The working layer comprises GaN (column 7 lines 40-60).
5. Letertre does not teach the method of annealing the ZnO.
6. Hosono teaches a method of annealing an atomically smooth zinc oxide layer. Said method comprises annealing at over 800 degrees. Said method further comprises surrounding the substrate with zinc (paragraph 0075-0077).
7. Atomically smooth is interpreted to mean smooth on an atomic scale; as atoms are about 3 angstroms in diameter atomically smooth would have an rms less than 10 angstroms.
8. It would have been obvious to one of ordinary skill in the art to surround the layer with zinc in order to prevent the evaporation of the high vapor pressure zinc oxide.
9. Letertre in view of Hosono does not teach the method of depositing GaN.

10. White teaches a method of depositing GaN on a ZnO substrate comprising PLD vapor deposition at a temperature not high than 510 degrees (column 7 lines 30-55).

11. It would have been obvious to one of ordinary skill in the art to deposit material using vapor deposition in order to form an epitaxial layer that will match the underlying material.

12. Letertre in view of Hosono in view of White does not teach the crystal orientation of the face used.

13. Yano teaches the use of 0001 ZnO with 0001 GaN (column 7 line 55-column 8 lines 5).

14. It would have been obvious to one of ordinary skill in the art to use 0001 ZnO with 0001 GaN in order to get a very low degree of mismatch.

15. Regarding claim 29.

16. White teaches a method of depositing GaN on a ZnO substrate comprising PLD vapor deposition at a temperature not high than 510 degrees (column 7 lines 30-55).

17. It would have been obvious to one of ordinary skill in the art to deposit material using vapor deposition in order to form an epitaxial layer that will match the underlying material.

18. Regarding claim 30.

19. White teaches a method of depositing GaN on a ZnO substrate comprising PLD vapor deposition at a temperature not high than 510 degrees (column 7 lines 30-55).

Further, ambient temperature does not limit the claim because any given temperature can be ambient.

20. It would have been obvious to one of ordinary skill in the art to deposit material using vapor deposition in order to form an epitaxial layer that will match the underlying material.

***Conclusion***

21. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Goodwin whose telephone number is (571)272-8451. The examiner can normally be reached on Monday through Friday, 9:00am through 5:00pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Loke can be reached on (571)272-1657. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DJG

STEVEN LOKE  
SUPERVISORY PATENT EXAMINER

A handwritten signature in black ink, appearing to read "Steven Loke", is written over the printed name and title.